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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/605,215

09/16/2003

Yu-Wen Chen

10039-US-PA

2214

31561

7590

02/09/2005

JIANQ CHYUN INTELLECTUAL PROPERTY OFFICE
7 FLOOR-1, NO. 100
ROOSEVELT ROAD, SECTION 2
TAIPEI, 100
TAIWAN

EXAMINER

IM, JUNGHWA M

ART UNIT

PAPER NUMBER

2811

DATE MAILED: 02/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/605,215	Applicant(s) CHEN ET AL.	
	Examiner Junghwa M. Im	Art Unit 2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 December 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 and 15-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 and 15-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

Applicant's election of claims 1-9 and 15-22 in the reply filed on December 28, 2004 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-5, 9 and 15-19 are rejected under 35 U.S.C. 102(e) as being anticipated by Huang et al. (US 6507119), hereinafter Huang.

Regarding claim 1, Fig. 3C of Huang shows a flip-chip substrate [120], wherein at least a chip [110] is attached to the flip-chip substrate and the chip has an active surface [110a] with a plurality of bonding pads [111] and each bonding pad has a bump [130] thereon, the substrate comprising:

a plurality of contact pads [122] embedded in the substrate, wherein locations of the contact pads are arranged corresponding to locations of the bonding pads on the chip, wherein

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any two contact pads align with their two corresponding bonding pads at a melting point of the bumps (through soldering the balls to the corresponding pads; col. 1, lines 59-64).

Also note that “at the melting point” is a process designation, understood to give rise to a doped region, and would thus not carry patentable weight in this claim drawn to a product. See *In re Thorp*, 227 USPQ 964 (Fed. Cir. 1985).

Regarding claim 2, Fig. 3C of Huang shows the substrate (a ceramic substrate; col. 5, line 5) has a coefficient of thermal expansion greater than that of the chip (col. 2, lines 14-16).

Regarding claim 3, Fig. 3A of Huang shows a distance between any two bonding pads is greater than a distance between their two corresponding contact pads at room temperature (before the bonding of the chip to the substrate).

Also, note that claim 3 recites an intermediate structure of the device recited in claim 1.

Regarding claim 4, Fig. 3C of Huang shows the contact pads are arranged in arrays.

Regarding claim 5, Fig. 3C of Huang shows the bonding pads and the bumps are arranged in arrays.

Regarding claim 9, Fig. 3C of Huang shows the substrate has a plurality of cavities and each contact pad is exposed by one cavity.

Regarding claim 15, Fig. 3C of Huang shows a chip [110] for bonding with a substrate [120], wherein the substrate has a plurality of contact pads [122] and a plurality of cavities, each contact pad being exposed by one cavity, the chip comprising: a plurality of bonding pads [111] on an active surface [110a] of the chip with a bump [130] on each bonding pad, wherein any two of the bumps are aligned to the corresponding two cavities on the substrate.

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Regarding claim 16, Fig. 3C of Huang shows the substrate (a ceramic substrate; col. 5, line 5) has a coefficient of thermal expansion greater than that of the chip.

Regarding claim 17, Fig. 3A of Huang shows a distance between any two bumps is greater than a distance between their two corresponding cavities at room temperature (before the bonding of the chip to the substrate).

Also, note that claim 17 recites an intermediate structure of the device recited in claim 15.

Regarding claim 18, Fig. 3C of Huang shows the cavities are arranged in arrays.

Regarding claim 19, Fig. 3C of Huang shows the bumps are arranged in arrays

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 6-8 and 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huang in view of Hilton (US 6737752).

Regarding claims 6-8, Huang discloses the most aspect of the pending claim except a flip-chip package wherein one of the contact pads at the center of the contact pad array serves as a first expansion reference mark and one of the bonding pads at the center region of the bonding pad array corresponding to the first expansion reference mark serves as a second expansion reference mark such that the first expansion reference mark on the substrate is aligned to the

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second expansion reference mark on the chip. Hilton discloses a flip-chip package wherein one of the contact pads at the center of the contact pad array serves as a first expansion reference mark and one of the bonding pads at the center region of the bonding pad array corresponding to the first expansion reference mark serves as a second expansion reference mark such that the first expansion reference mark on the substrate is aligned to the second expansion reference mark on the chip (col. 4, line 39 – col. 6, line 28).

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to incorporate the teachings of Hilton into the device of Huang in order to have the center portion of the contact pads and the bonding pads a reference mark during the alignment process to achieve stronger bonding.

The subject matters regarding claims 20-22 have been discussed in claims 6-8.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Junghwa M. Im whose telephone number is (571) 272-1655. The examiner can normally be reached on MON.-FRI. 8:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C Lee can be reached on (571) 272-1732. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

jmi

A handwritten signature in black ink, appearing to read 'Eddie Lee', with a large, sweeping initial 'E'.

EDDIE LEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800